ROBERT E. BUSHNELL*†

HENRY M. ZYKORIE
JOSEPH G. SEEBER°
JOHN C. BROSKY°+*
DARREN R. CREW+*
MATTHEW J. LESTINA‡*

MICHAEL D. PARKER
DANIEL A. GESELOWITZ, PH.D.
(REG. PATENT AGENTS)

† ADMITTED IN MARYLAND
° ADMITTED IN VIRGINIA
+ ADMITTED IN PENNSYLVANIA
‡ ADMITTED IN NEW YORK
* NOT ADMITTED IN D C.

R. E. BUSHNELL
ATTORNEY AT LAW
1522 K STREET, N.W., SUITE 300
WASHINGTON, D.C. 20005-1202
UNITED STATES OF AMERICA

INTELLECTUAL PROPERTY LAW
TELEPHONE (202) 638-5740
(202) 408-9040
FACSIMILE (202) 628-0755
FACSIMILE (202) 289-7100
FACSIMILE (202) 628-3835
(410) 747-0022
E-MAIL: BUSHNELL@CWIXMAIL.COM
E-MAIL: REBUSHNELL@AOL.COM

15 October 1999

Jc698 U.S. PTO 09/419300 10/15/99

- ❑ *U.S. Postal Service*
- ❑ *Via Local Courier*
- ❑ *Via International Courier*
- ❑ *Via Facsimile No.* _____
- ❑ *Via E-Mail Attachment*
- ❑ *Please Acknowledge Receipt*

Assistant Commissioner for Patents
Washington, D.C. 20231

Attorney Docket: P55862

Jc685 U.S. PTO 10/15/99

Sir:

Submitted herewith is the following patent application:

Inventor: **PHIL-TAE KIM**

Title: **METHOD FOR CONTROLLING POSITION OF INDICATOR**

Please find attached hereto an application for patent which includes: Specification and Abstract, Claims, original Declaration And Power of Attorney, Assignment, and a certified copy of the foreign priority document identified below:

Verified Showing of Small Entity Status: **NO**

Drawings: **Formal** drawings, 12 sheets, Figures 1 through 17

Claim of priority under 35 U.S.C. §119: **YES**

** The Republic Of Korea Application No. 43162/1998 filed on 15 October 1998

FEE (see formula below): CHECK IS NOT ENCLOSED

Basic Fee $380/760	$760.00
Additional Fees:	
Total number of claims in excess of 20: ___ times $9/18 .	$0.00
Number of independent claims in excess of 3: 1 times $39/78	$78.00
Multiple Dependent Claims $130/260	$0.00
An Assignment is likewise enclosed: Recording Fee $40 . .	$0.00
Filing Non-English specification	$0.00
TOTAL FEES FOR THE ABOVE APPLICATION	***$838.00***

Docket No.: P55862

Inventor: **PHIL-TAE KIM**

Title: **METHOD FOR CONTROLLING POSITION OF INDICATOR**

In view of the above, it is requested that this application be accorded a filing date pursuant to 37 CFR 1.53(b).

Please address all correspondence to:

Robert E. Bushnell
1522 K Street, N.W.
Suite 300
Washington, D.C. 20005

Respectfully submitted,

Robert E. Bushnell
(Registration No. 27,774)
Payor No.: 008-439
Attorney for the Applicant
1522 K Street, N.W.
Suite 300
Washington, D.C. 20005

Telephone: (202) 638-5740
Telefacsimile: (202) 628-0755

REB/kf

TITLE OF THE INVENTION

METHOD FOR CONTROLLING POSITION OF INDICATOR

CLAIM OF PRIORITY

This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C. §119 from an application entitled *Method for Controlling Position of Indicator* earlier filed in the Korean Industrial Property Office on 15 October 1998, and there duly assigned Serial No. 98-43162 by that Office.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an interface apparatus and process using menus, and more particularly, to an apparatus and process for controlling the position of an indicator on the screen of a video display device.

Description of the Related Art

Different circuits and processes enabling a user to interface with an appliance by using menus has been widely used for information processing devices such as computers and television receivers. In these interface methods, the requirement of a user is received through menus displayed on a screen, and a desired item is selected by moving an indicator such as a pointer. The indicator

is usually a typical pointer, and a work or task bar which is inverted or highlighted. The pointer is operated by a trackball or a joy stick installed on a remote controller, and the bar is operated by a channel up and down key or a volume up and down key installed on a controller or a panel.

For instance, in a television receiver having a small number of selectable channels, a particular channel is selected via one of ten keys or a channel up and down button of the remote controller, but in a digital television receiver having substantially more selection channels, programs of various channels are obtained through a program guide screen, and a specific channel for a particular program is selected through a pointer. Adjustment of display, time setting, and control of volume as well as channel selection can be interfaced through a menu.

In the interface method using menus, when a selected menu item has sub menus or adjustment items, corresponding sub menus are displayed on the screen. For instance, for the control of volume, sub menus for selecting left/right/center/surround speakers are displayed. When the left speaker is selected, a slide-bar displays an adjustment screen for adjusting the volume of the left speaker.

A user selects a desired sub menu item from the displayed sub menus or moves a pointer for changing the adjustment state.

However, in the conventional interface method, the sub menus are displayed but the pointer is located in a position in which main menu items are selected so that the pointer must be moved to an area where the sub menus are displayed. When the sub menus are displayed in a position far from the main menu, an excessive amount of time is wasted in moving the pointer, which causes inconvenience in interfacing with a user.

Also, in the conventional interface method, even if the position and the scale of the menu are changed, the position of the pointer is not changed so that the pointer must be moved by a user to an area where the changed menu is displayed. In the case of using a cursor controller such as trackball or a remote controller to operate a pointer, when the response is very slow, the amount of time taken to move the pointer is increased so that the interface method using menus may be regarded as being difficult.

An exemplar of the contemporary, Choi (U.S. Patent 5,648,781, *Method and Apparatus for Remotely Controlling Electrical Appliances Using a Trackball and Display*, July 15, 1997) discloses a remote control method and apparatus. The remote control for electrical appliances has a trackball used to select functions using control menus. The movement for the pointer is fully dependent upon a user's movement of the trackball. The initial location of the pointer is not limited to the menu area. The pointer can be anywhere on the display screen. When a user goes to a submenu and then reverts back to the main menu, the pointer does not follow the menu area. A user has to make extra steps in having to move the trackball to find the previous menu area.

Morito (U.S. Patent 5,448,240, *Remote Control Input Device*, September 5, 1995) discloses an input device comprised of a rotatable cylinder shape. The device is limited to a direction on one axis at a time. Free movement in all directions of a pointer device is not allowed.

Kayashima et al. (U.S. Patent 5,488,427, *Television System Including Television Set, and Accessory Devices Controlled by a Single Remote Control Device*, January 30, 1996) discloses a television system having method and apparatus for selecting preset or use determined devices. A remote control device is shown to have buttons to display and select an on screen menu. Menu items

are selecting by selecting the corresponding buttons on the remote control. The item selected is show on the display. A problem with Kayashima et al. '427 is that it requires too many buttons for rapidly and conveniently controlling a television.

Yamamoto (U.S. Patent 5,457,446, *Control Bus System with Plural Controllable Devices*, October 10, 1995) discloses a control bus system for a home entertainment system. The control bus further comprises a display means for displaying the features to be executed by the control bus. A cursor is moved to display item to be selected. Yamamoto '446 , requires extra movement to locate the area to be selected.

Buchner et al. (U.S. Patent 5,532,753, *Remote-Controlled On-Screen Audio/Video Receiver Control Apparatus*, July 2, 1996) discloses a remote controlled device that displays its options on a display screen. The pointer is controlled by apparatus like a trackball , joy stick or touch panel. The pointer is freely moving with the control screen. Buchner et al. '753 does not store the area location of a previous menu so when a user reverts to an old menu, the pointer is not situated in same area.

I have found that in devices such as a digital television having many selection and adjustment items which cannot be smoothly operated by direct operation of a key, the interface using menus is very important for marketing the devices, so that ensuring of quick response for selecting menus is very important.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a method of controlling the position of an indicator in an interface using a menu in which an indicator follows to the menu in accordance with the generation and change of the menu, to thereby ensure quick response for selecting the menu.

According to an embodiment of the method for controlling the position of an indicator of the present invention, to achieve the above object, when a menu having items selected and adjusted by the indicator is displayed, and an item having sub items capable of being selected and adjusted is selected, the sub items are displayed and the indicator is located in the area where the sub items are displayed.

According to another embodiment of the method for controlling the position of an indicator of the present invention, to achieve the above object, when a menu having items selected and adjusted by an indicator is displayed, and the position and a size of the menu are changed, the indicator follows the changed menu.

BRIEF DESCRIPTION OF THE DRAWINGS

The above object and advantages of the present invention will become more apparent by describing in detail a preferred embodiment thereof with reference to the attached drawings in which:

FIG. 1 is a view for conceptually showing an interface method using menus;

FIG. 2 shows the appearance of the remote controller of FIG. 1;

FIG. 3A is an example of a menu screen in the interface method;

FIG. 3B is a screen when a menu item including a sub menu is selected from the menu of FIG. 3A;

FIG. 4A is another example of a menu screen in the interface method;

FIG. 4B is a screen when the menu of FIG. 4A is enlarged;

FIG. 5A is an example of a reduced program guide screen in the interface method;

FIG. 5B is an example of when the program guide of FIG. 5A is enlarged;

FIG. 6 is a flowchart of an embodiment of a method for controlling the position of an indicator according to the present invention;

FIG. 7 shows a screen generated by the method of FIG. 6;

FIG. 8 is a flowchart of another embodiment of a method for controlling a position of an indicator according to the present invention;

FIG. 9A shows a reduced menu of a screen generated by the method of FIG. 8;

FIG. 9B shows an enlarged menu of a screen generated by the method of FIG. 8;

FIG. 10 is a flowchart of still another embodiment of a method for controlling the position of an indicator according to the present invention;

FIGS. 11A and 11B are screens generated by the method of FIG. 10;

FIG. 12 shows the structure of data for menu items;

FIG. 13 is for showing the relationship between menu items and sub menu items thereof;

FIG. 14 shows an example of a menu item region displayed on a screen;

FIG. 15 is a block diagram showing the structure of an apparatus in which the method of FIG. 6 is used;

FIG. 16 is a block diagram showing the structure of another apparatus in which the method of FIG. 8 is used; and

FIG. 17 is a block diagram showing the structure of an apparatus in which the method of FIG. 10 is used.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 conceptually shows a interface method in which the television receiver is controlled by a remote controller. The television receiver 200 is controlled by the remote controller 100 of FIG. 1. The television receiver 200 displays a menu screen for a user's selection, and a desired item is selected from the menu items displayed on the screen by a pointer. Also, the desired item can be selected from the menu items displayed on the screen by operation of an inverted or highlighted bar. The display screen can be for example a cathode ray tube, liquid crystal display, projection screen, or any other similar display devices.

Referring to FIG. 2, a remote controller includes a power supply key 20, a trackball 22, a selection key 24, a menu key 26, an enlargement and reduction key 28, and a program guide key 30. The menu key 26 is a key for displaying a main menu on a screen, the trackball 22 is a device for moving the pointer displayed on the screen, and the selection key is a key for selecting a menu item on which the pointer is located. Other pointing devices or cursor controllers may be used like a mouse, touchpad, and joy stick. The enlargement and reduction key 28 is a key for enlarging or reducing the size of the menu displayed on the screen, and the program guide key 30 is a key for displaying program guide information on the screen. The pointer can be moved by a joystick, a channel up and down key or a volume up and down key as well as the trackball 22.

In the television receiver 200, a main menu is displayed on the screen or erased in response to pressing the menu key 26. That is, the menu key 26 operates as a toggle key. When the menu is displayed on the screen, the pointer for selecting the menu also is displayed.

In the television receiver 200, the position of the pointer displayed on the screen is controlled in response to operation of the trackball 22, and operation allocated to the menu item on which the pointer is located is performed in response to the selection key 24. If the selected menu item includes sub menus, the sub menus are displayed.

In the television receiver 200, the size of a menu is enlarged or reduced in response to the enlargement and reduction key 28. In order to reduce the size of the menu, a screen is divided into two parts. A program image is displayed in one part, and a menu is displayed in the other part. In order to enlarge the size of the menu, the enlarged menu is displayed on the screen.

The remote controller 100 periodically detects the position of the trackball 22 to control the position of the pointer, and transmits changes in position corresponding to the detected position. That is, the remote controller 100 reads the direction to which the pointer is to be moved, through the trackball 22, and transmits a signal that moves the pointer in the same direction as the trackball 22. For instance, when a user moves the trackball 22 to the left for three seconds, the signal for periodically moving the pointer to the left is transmitted to the television receiver 200 for three seconds.

In the television receiver 200, the position of the pointer is changed in response to the signal transmitted from the remote controller 100. When the pointer is located on the item which is to be selected by the pointer, the user presses the selection key 24 of the remote controller 100, and the television receiver 200 performs the command corresponding to the selected item.

FIG. 3A which shows an example of a menu screen in a interface method where a menu is overlapped with a program image. In FIG. 3A, reference numeral 32 denotes a pointer, and reference numeral 34 denotes a main menu.

FIG. 3B is a screen after a menu item corresponding to a sub menu has been selected from the main menu 34 of FIG. 3A. In FIG. 3B, reference numeral 36 denotes a sub menu.

In the bar of FIG. 3B, the pointer is located on the selected main menu item.

As shown in FIG. 3B, when the distance between the main menu 34 and the sub menu 36 is long, much time is required for moving the pointer 32 to select a sub menu item.

Referring to FIG. 4A, in the television receiver 200, the menu reduced in response to the menu key 26 of the remote controller 100 is displayed. In order to display the reduced menu, the screen of the television receiver 200 is divided into two parts. A program image is displayed in one part, and a menu is displayed on the other part.

In FIG. 4A, reference numerals 40, 42, 44 and 46 denote an image where a program image signal is displayed, a pointer, a main menu and an area where the menu is displayed.

As shown in FIG. 4A, the pointer 42 is located in a position before the menu is displayed. Thus, in order to select a menu item, the pointer 42 must be moved to the menu 44.

FIG. 4B shows a screen when the enlargement and reduction key 28 is pressed for the screen of FIG. 4A. In FIG. 4B, the menu 44 enlarged in response to the enlargement and reduction key 28 of the remote controller 100 is displayed.

Also, only the enlarged menu 44 is displayed on the screen.

As shown in FIG. 4B, the pointer 42 is located in the position before the menu 44 is enlarged. Thus, in order to select the menu item, the pointer 42 must be moved to the menu 44.

In FIG. 5A, the program list which is reduced in response to the program guide key 30 of the remote controller 100 is displayed. In order to display the reduced program list, the screen of the television receiver 200 is divided into two parts. Here, a program image is displayed in one part, and the program list is displayed on the other part.

In FIG. 5A, reference numerals 50 denotes an area where the program image is displayed, 52 denotes a pointer, 54 denotes a program list and 56 denotes an area where the program list is displayed. As shown in FIG. 5A, the pointer is located in the area where the program image is displayed.

In FIG. 5B, the program list 54 has been enlarged in response to the enlargement and reduction key 28 of the remote controller 100 and the enlarged program list is displayed. As shown in FIG. 5B, the pointer 52 is located in the position before the program list 54 is enlarged.

In a method for controlling the position of an indicator according to the present invention, in order to display a menu or a program list, the indicator is located in a menu area or a program list area, so that it is unnecessary to move the pointer to the menu area or the program list area.

In a method shown in FIG. 6, a sub menu 36 is displayed on a screen in response to the menu key 26 of the remote controller 100 (S600).

The pointer 32 is located in the sub menu area (S605). When the sub menu 36 is displayed, the pointer 32 is located on the sub menu area, so that the sub menu item can be easily selected.

Then, the position of the pointer 32 is controlled in response to the trackball 22 of the remote controller 100 (S610).

The remote controller 100 periodically transmits the amount of change in the x and y-directions in accordance with operation of the trackball 22, in order to move the pointer 32. In the

television receiver 200, a new coordinate value is calculated by adding the amount of change transmitted by the remote controller 100 to the coordinate value where the pointer 32 is located, and the pointer is displayed on the calculated coordinate value.

Then, the sub menu allocated to the sub menu item where the pointer 32 is located is performed in response to the selection key 24 of the remote controller 10 (S620).

By the method of FIG. 6, the pointer 32 is located on an area where the sub menu 36 is displayed so that the sub menu item can be selected by minimum operation.

The position where the pointer 32 is located may be the first sub menu item. FIG. 7 shows a screen which results from performing step 605. Comparing the interface method illustrated by FIG. 3B to the method for controlling a position of an indicator according to the present invention of FIG. 7, when the sub menu 36 is displayed, the pointer 32 is located in the sub menu area so that time for moving the pointer 32 to the sub menu area is reduced.

As shown in FIG. 6, when the sub menu 36 is erased, the pointer 32 is located in the selected menu item. Thus, the selected item is stored, and the pointer is located in the stored menu item when the sub menu 36 is erased.

Referring to FIG. 8, the menu reduced in response to the menu key 22 of the remote controller 100 is displayed, and the menu is enlarged and reduced in response to the enlargement and reduction key 28. In reducing the menu, the screen of the television 200 is divided into two parts. A program image is displayed in one part, and a menu is displayed in the other part (S800). Only the enlarged menu is displayed on the screen.

Referring also to FIGS. 9A and 9B, the pointer 42 is located on the menu area (S805). In order to reduce or enlarge the menu 44, the pointer 42 is located on the menu area so that the menu item can be easily selected.

The position where the pointer 42 is located may be the first menu item.

FIGS. 9A and 9B show reduced and enlarged menu screens that result from performing step 805.

Comparing the interface method of FIG. 4A to the method for controlling the position of an indicator according to the present invention, when the reduced menu is displayed, the pointer 42 is located in a menu area so that the time taken to move the pointer 42 to the menu area is reduced.

Also, comparing the interface method of FIG. 4B to the method for controlling the position of an indicator of FIG. 9B according to the present invention, when the enlarged menu is displayed, the pointer 42 is located in the menu area so that the time taken to move the pointer 42 to the menu area is reduced.

The position of the pointer 42 is controlled in response to the trackball 22 of the remote controller 100 (S810).

The television receiver 200 performs a command allocated to the menu item where the pointer 42 is located in response to the selection key 24 of the remote controller 100 (S820). When the selected menu item includes the sub menu, the sub menu and the pointer are displayed according to the method of FIG. 6.

The method of FIG. 8, which is adopted to the case of reducing and enlarging the menu, can be adopted to the case of changing the position of the menu. Here, the position of the pointer is moved by the moving degree of the menu.

In the method of FIG. 10, a reduced program list is displayed in response to the program guide key 30 of the remote controller 100, and the enlarged or reduced program list is displayed in response to the enlargement and reduction key 28. In order to display the reduced program list, the screen is divided into two parts. Referring also to FIGS. 11A and 11B, a program image is displayed in one part, and a program list 54 is displayed in the other part (S1000).

Only the enlarged program list 54 is displayed on the screen.

The pointer 52 is located in a program list area (S1005). When the program guide image id displayed, the pointer 52 is located in the program list area so that a desired program can be easily selected.

An item where the pointer 52 is located may be the first channel.

FIGS. 11A and 11B which show screens resulting from step 1005 show reduced and enlarged program lists.

Comparing the interface method of FIG. 5A to the method for controlling the position of an indicator of FIG. 11A according to the present invention, when the program list is displayed, the pointer 52 is located in a program list area so that the amount of time taken to move the pointer 52 to the program list area is reduced.

Comparing the interface method of FIG. 5B to the method for controlling a position of an indicator of FIG. 11B according to the present invention, when the enlarged program list is displayed, the pointer 52 is located in the program list area so that the amount of time taken to move the pointer 52 to the program list area is reduced.

The position of the pointer 52 is controlled in response to the trackball 22 of the remote controller 100 (S1010).

The television receiver 200 performs a command allocated to the item where the pointer 52 is located in response to the selection key 24 of the remote controller 100 (S1020). When a channel is selected, detailed information on the channel is displayed, and when a program is selected, detailed information on the selected program is displayed.

Referring to FIG. 12, data for the menu item is comprised of an identifier 120, area information 122, information 124 indicating whether the sub menu exists or not, address information 126 indicating a position where information on a sub menu is stored, and command information 128 indicating a command allocated to the menu item when there is no sub menu.

The identifier 120 indicates the name of the menu item. The area information 122 indicates coordinate information of areas where the corresponding menu item is displayed, and has coordinate information of two points of a diagonal line of a general tetragon. When the selection key 24 is pressed, the television receiver 200 determines to which area information the coordinate value where the pointer is located belongs and identifies the selected menu item.

The menu item has sub menus so that the menu has a tree structure as shown in FIG. 13. In FIG. 13, main menu items main#1, main#2, and main#3 have respective sub menus.

Menu items of FIG. 14 have an area of a tetragon indicated by (x1, y1)(x2, y2). The pointer is located at the center point of the tetragonal area of the menu item. The coordinates of the center point of the tetragon area are ((x1+x2)/2, (y1+y2)/2).

When the menu screen is displayed, the pointer is located in the first item of the menu screen. In FIG. 6, the coordinates where the pointer is located are ((x1+x2)/2 + x, (y1+y2)/2). Here, reference character x indicates an offset in accordance with reduction and enlargement of the menu

which is a value from the left of the screen. When the position of the menu is changed, the movement amount (x_m, y_m) of the menu is adopted.

FIG. 15 shows a more detailed view of the remote controller 100 and the television receiver 200 of the present invention. The remote controller 100 includes a menu key 152, a selection key 154, a trackball 156, a trackball movement sensor 158, a data generator 160, a control commander 162 and a transmitter 164.

The television receiver 200 includes a receiver 252, a menu display unit 254, a menu information storage unit 256, a pointer display unit 258, a menu performer 256 and a screen generator 262.

When the menu key 152 of the remote controller 100 is pressed, the data generator 160 generates a menu display command.

The menu display unit 254 obtains information of the main menu from the menu information storage unit 256 in response to the menu display command received through the receiver 252, and displays the main menu corresponding thereto.

At this time, the pointer display unit 258 displays the pointer on a center point with reference to the area information of the item where the pointer is to be located.

When the trackball 156 is moved to select the corresponding menu item from the menus displayed on the screen, the trackball movement sensor 158 senses the movement of the trackball 156 in the x and y-directions. The data generator 160 periodically generates a pointer movement command which includes the amount of change in position sensed by the trackball movement sensor 158. The pointer movement command of the data generator 160 is transmitted by the transmitter 164.

The receiver 252 receives a pointer movement signal generated by the transmitter 164 of the remote controller 100. The pointer display unit 258 controls the position of the pointer in response to the received pointer movement signal.

When the selection key 154 of the remote controller 100 is pressed, the menu performer 260 performs a command of the menu item where the pointer is located in response to the menu item selected by the selection key 154.

When the selected menu item includes sub menu items, the menu performer 260 controls the menu display unit 254 to thereby display the sub menu. The menu display unit 254 obtains information on the sub menu from the menu information storage unit 256 and displays the sub menu corresponding to the information.

The pointer display unit 258 displays a pointer in the center point of the item where the pointer is to be located, with reference to the area information.

The screen generator 262 overlaps the menu image signal generated by the menu display unit 254 with an image signal and supplies the overlapped signal to a display unit (not shown).

In FIG. 16, portions which perform the same operations as those of FIG. 15, are assigned by the same reference numerals.

In FIG. 16, reference numeral 166 denotes an enlargement and reduction key, and reference numeral 264 is a screen divider in which a menu image signal generated by the menu display unit 254 and a program image signal generated by a tuner (not shown) are synthesized or each signal is displayed.

When the enlargement and reduction key 166 of the remote controller 100 is pressed, the data generator 160 generates enlargement and reduction commands. When the enlargement and reduction

key 166, a toggle key, is pressed once, the enlargement command is generated, and when the key is pressed once more, the reduction command is generated.

The menu display unit 254 obtains information on the main menu screen from the menu information storage unit 256 in response to the enlargement and reduction commands received through the receiver 252, and displays the corresponding menu.

At this time, the pointer display unit 258 displays the pointer in the center point of the item where the pointer is to be located, with reference to the area information.

The screen divider 264 synthesizes program image signal and menu image signal generated by the menu display unit 254 or displays each signal on the screen, and supplies the signals to a cathode ray tube (CRT, not shown).

FIG. 17 is a block diagram showing the structure of an apparatus in which the method of FIG. 10 is used.

Portions of FIG. 17 which perform the same operations as those of FIG. 16, are assigned by the same reference numerals. In FIG. 17, reference numeral 266 denotes a program guide information storage for storing program guide information detected from the image signal. The program guide information includes a name of the program, guide information, and data of starting time and ending time.

The program guide information generator 254 obtains program guide information from the program guide information storage 366 in response to the program guide command received through the receiver 252, and generates a corresponding program guide image signal.

At this time, the pointer display unit 258 displays the pointer on the item with reference to the area information of the program item where the pointer is to be located.

When the enlargement and reduction key 166 of the remote controller 100 is pressed, the data generator 160 generates enlargement and reduction commands. When the enlargement and reduction key which is a toggle key is once pressed, the enlargement command is generated, and when the key is more once pressed, the reduction command is generated.

The program guide information generator 254 obtains program guide information from the program guide information storage 366 in response to the enlargement and reduction command received through the receiver 252, and displays corresponding enlargement and reduction program list.

At this time, the pointer display unit 258 displays the pointer in the center point with reference to the area information of the item where the pointer is to be located.

The receiver 252 receives a pointer movement signal generated by the transmitter 164 of the remote controller 100. The pointer display unit 258 controls the position of the pointer in response to the received pointer movement signal.

When the selection key of the remote controller 100 is pressed, corresponding command is performed. For instance, in order to select a program, the program guide performer 268 obtains a channel number of the program where the pointer is located and supplies the obtained channel number to the tuner 270.

When the reduced program list is displayed, the screen divider 262 synthesizes program image signals and program guide image signals generated by the menu display unit 254 or each signal is displayed, and supplies the signal to a display unit (not shown).

The present invention in which a selection item is commanded by a pointer has been described, can be adopted to the case of changing colors of the selected item, i.e., highlighting or inverting colors of the selection item.

According to the interface method of the present invention, an indicator is located in one of the selection items when the selection items are displayed so that only a small amount of movement is required by the indicator, which enables easy interfacing with users.

What is claimed is:

1. A method, comprising the steps of:

displaying a menu and an indicator on a display screen by manually operating a remote controller, with said indicator being initially displayed at a predetermined position within said menu;

making a selection of a menu item displayed within said display screen by moving said indicator around said menu to said menu item;

storing a location of said menu item within said display screen;

displaying a sub menu of said menu item, with said sub menu being comprised of a plurality of sub menu items contextually related to said menu item, with said indicator being displayed on said display screen within an area of said sub menu where said sub menu items are displayed, and erasing said sub menu; and

automatically adjusting display of said indicator to display said indicator on said screen at said location of said menu item.

2. The method of claim 1, further comprised of automatically, initially displaying said indicator superimposed upon a first sub menu item of said sub menu upon initial said displaying of said sub menu.

3. The method of claim 1, further comprised of:

initiating display of said menu on said display screen by manually pressing a key on said remote controller;

moving said indicator within said screen by manipulating a cursor controller mounted on said remote controller; and

making said selection by manual manipulation of said selection key.

4. A method comprising the steps of:

displaying a menu and an indicator on a display screen by manually operating a remote controller, with said indicator being initially displayed at a predetermined position within said menu;

making a selection of a menu item displayed within said display screen by moving said indicator around said menu to said menu item;

storing a location of said menu item in reference to said menu area;

displaying items selected and adjusted by an indicator from said menu; and

changing a position and size of said menu, said indicator automatically following said menu.

5. The method of claim 4, wherein said indicator is located in an area where the changed said menu is displayed.

6. The method of claim 5, further comprised of:

initiating display of said menu on said display screen by manually pressing a key on said remote controller;

moving said indicator within said screen by manipulating a cursor controller mounted on said remote controller;

making said selection by manual manipulation of said selection key; and

changing the position and size of said menu by manual manipulation of an enlargement and reduction key.

7. The method of claim 6, wherein changing the position and size of said menu locates said indicator to the stored said location.

8. A method, comprising the steps of:

a menu key on a remote controller being pressed to display a menu on a display screen, an initial position of an indicator being in an area of said menu, said indicator able to position to anywhere on said display screen;

moving said indicator to a menu item location using a trackball on said remote controller, ;

selecting said menu item with a selection key on said remote controller;

storing location of said menu item;

performing a function of selected menu item;

displaying a sub menu of said menu;

said indicator positioning to a location of said sub menu;

selecting an item in said submenu;

performing function of said sub menu;

erasing said sub menu; and

automatically adjusting display of said indicator to display said indicator on said screen at said location of said menu item.

9. The method of claim 8, wherein said indicator is initially located in the center of said first menu item.

10. The method of claim 8, wherein after erasing said sub menu , said indicator locates back to a center of said stored location of said menu.

11. The method of claim 8, further comprising the steps of:

selecting and adjusting an item from said menu by using an indicator;

displaying items selected and adjusted by an indicator from said menu;

changing a position and size of said menu; and

said indicator automatically following said menu.

12. The method of claim 11, wherein changing the position and size of said menu makes said indicator locate to the stored said location.

13. The method of claim 8, wherein a trackball within a remote controller changes the location of said indicator, said trackball's change in vertical and horizontal direction correspond to change in vertical and horizontal direction of said indicator.

14. The method of claim 8, wherein said menu overlaps an image signal generated on said display screen.

15. The method of claim 8, wherein said menu is separated from an image signal generated on said display screen.

16. The method of claim 8, wherein said display screen is in a cathode ray tube.

17. An apparatus, comprising:

a trackball on a remote controller for controlling the movement of an indicator on a display screen relative to a predetermined initial position of said indicator on the screen to select a displayed menu item;

a trackball movement sensor sensing a shift value of the movement of said trackball along X-Y coordinates relative to the predetermined initial position of said indicator;

a selection key which selects said menu items;

a menu key which displays said menu on a display screen;

a shift value data storage unit accommodating the storing shift value data corresponding to the movement of said trackball relative to the initial indicator position;

a control commander selecting the control function corresponding to said menu item where said indicator is located when said selection key is activated;

a data generator , responsive to said remote controller for generating data corresponding to the stored shift value of said trackball received from said shift value data storage unit when said remote controller is activated; and

a transmitting means accommodating coding and transmitting data from said data generating means to an electrical appliance; and

wherein said electrical appliance comprises:

a receiver accommodating the data transmitted by said transmitting means;

a display control unit, connected to said receiver, displaying a menu on said display portion according to said received data;

an indicator display, said indicator display unit displays said indicator in a center point of a selected submenu;

said display screen ;

a microprocessor; and

a menu storage means, connected to said display control unit, for providing data which is displayed on said display portion.

ABSTRACT

An apparatus and process for controlling the position of an indicator in a user interface using a menu is disclosed. By the method, when a menu having items selected and adjusted by an indicator is displayed, and the position and a size of the menu are changed, the indicator follows the changed menu. Thus, an interface can be easily realized.

PATENT
P55862

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

PHIL-TAE KIM

Serial No.:	*to be assigned*	Examiner:	*to be assigned*
Filed:	15 October 1999	Art Unit:	*to be assigned*

For: METHOD FOR CONTROLLING POSITION OF INDICATOR

TRANSMITTAL OF DECLARATION

Assistant Commissioner
for Patents
Washington, D.C. 20231

Sir:

This transmittal accompanies a Declaration without the signature by the inventor(s), for the above-captioned application. A Substitute Declaration with the inventor(s)'s signature will be filed upon receipt of the Serial No. for the above-captioned application.

Respectfully submitted,

Robert E. Bushnell,
Attorney for the Applicant
Registration No.: 27,774

Suite 300, 1522 "K" Street, N.W.
Washington, D.C. 20005
(202) 638-5740

Folio: P55862
Date: 10/15/99
I.D.: REB/kf

FIG. 1

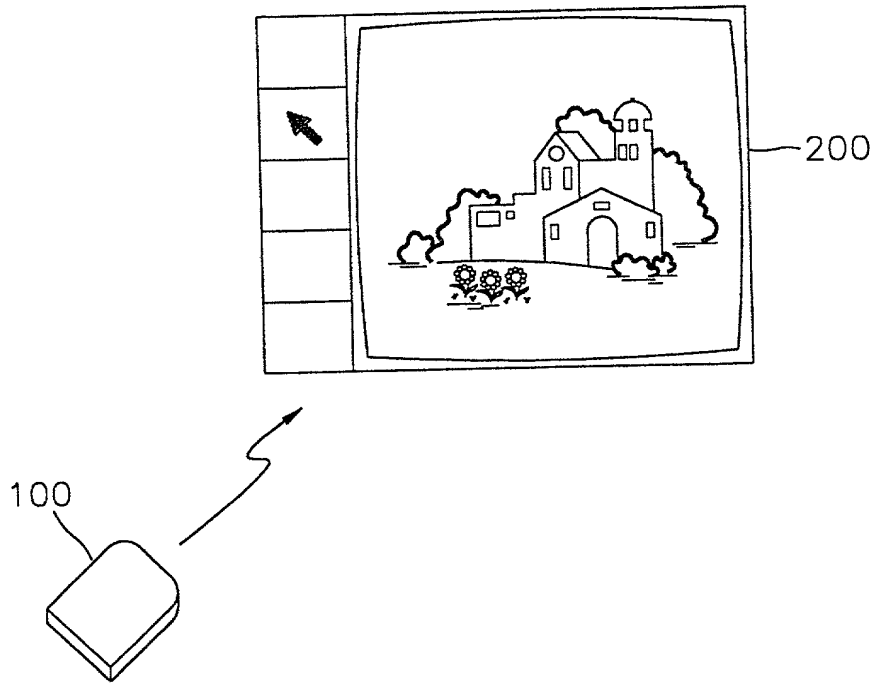


FIG. 2

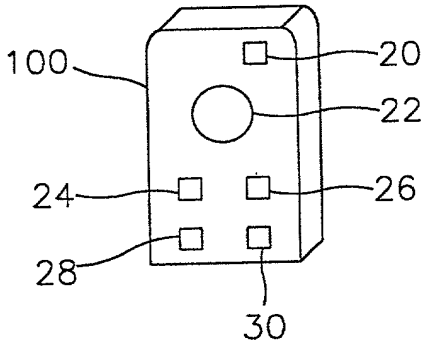


FIG. 3A

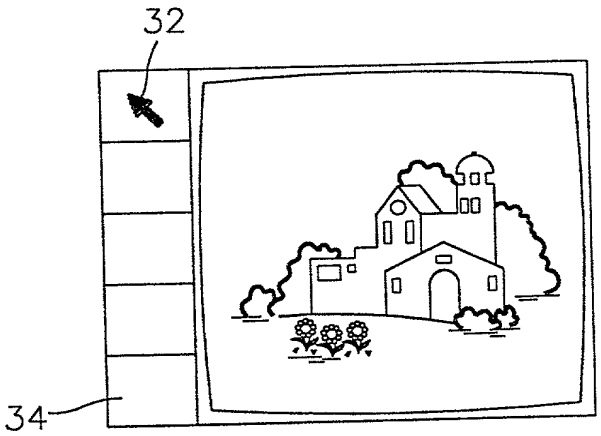


FIG. 3B

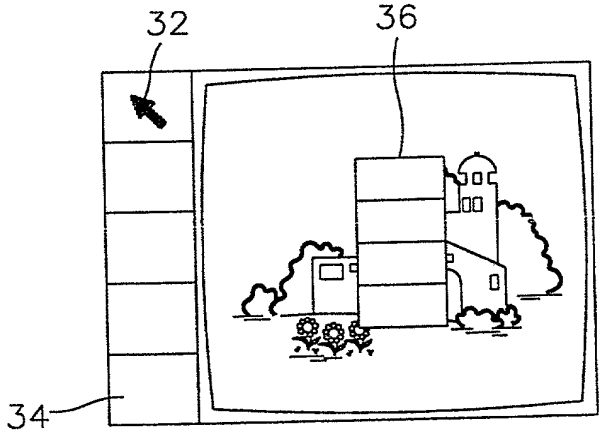


FIG. 4A

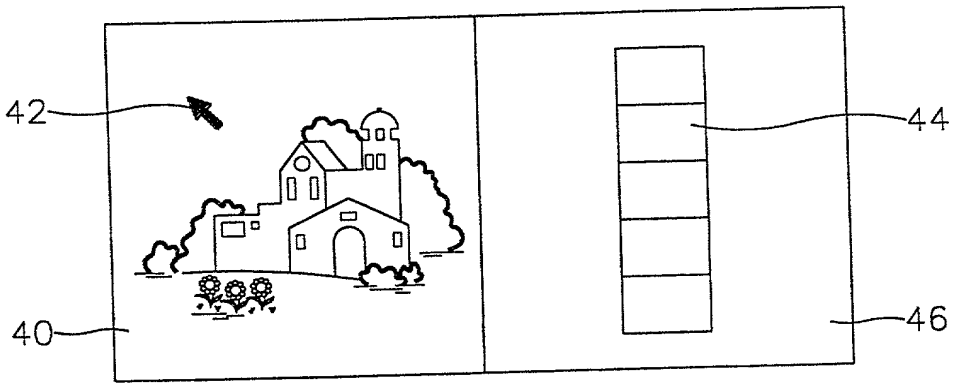


FIG. 4B

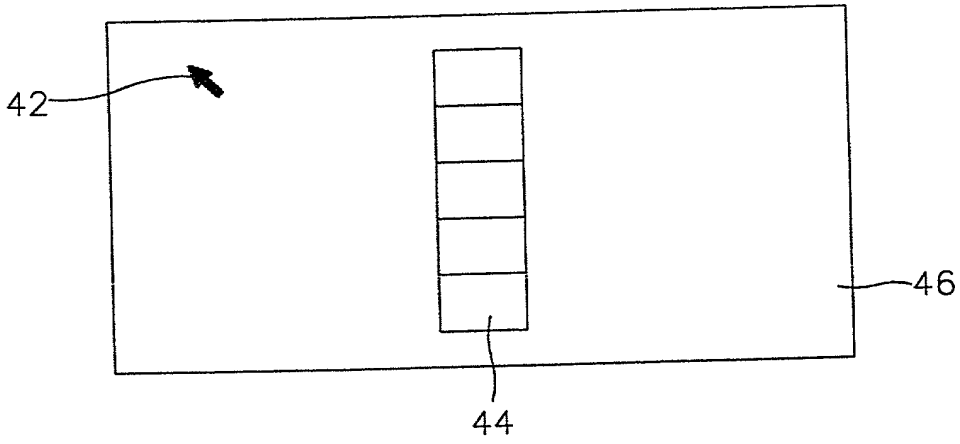


FIG. 5A

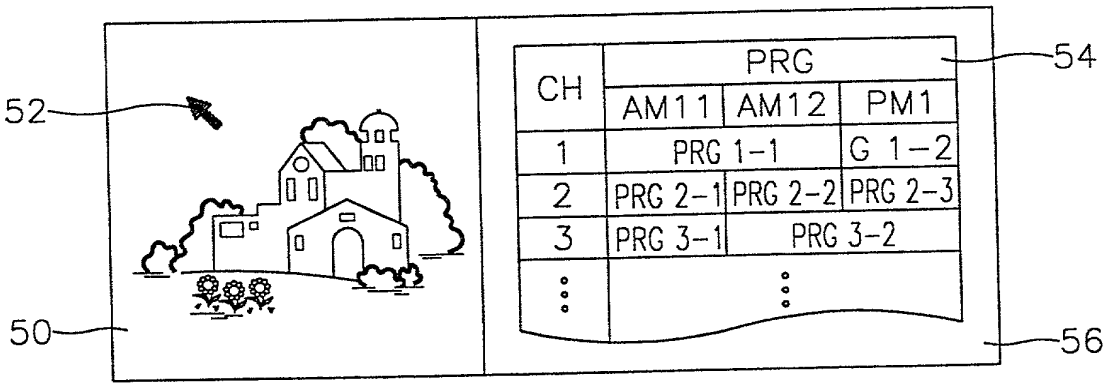

52
50
CH
PRG
AM11
AM12
PM1
1
PRG 1-1
G 1-2
2
PRG 2-1
PRG 2-2
PRG 2-3
3
PRG 3-1
PRG 3-2
54
56

FIG. 5B

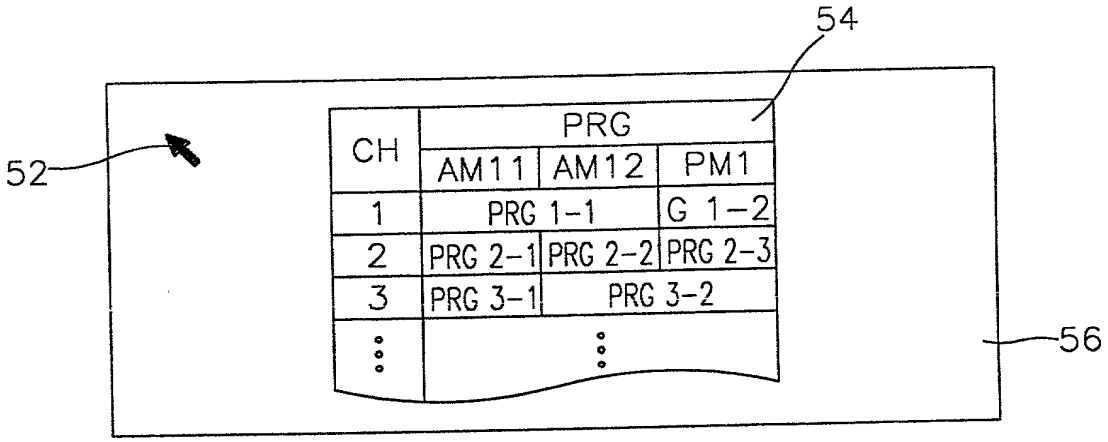

54
52
CH
PRG
AM11
AM12
PM1
1
PRG 1-1
G 1-2
2
PRG 2-1
PRG 2-2
PRG 2-3
3
PRG 3-1
PRG 3-2
56

FIG. 6

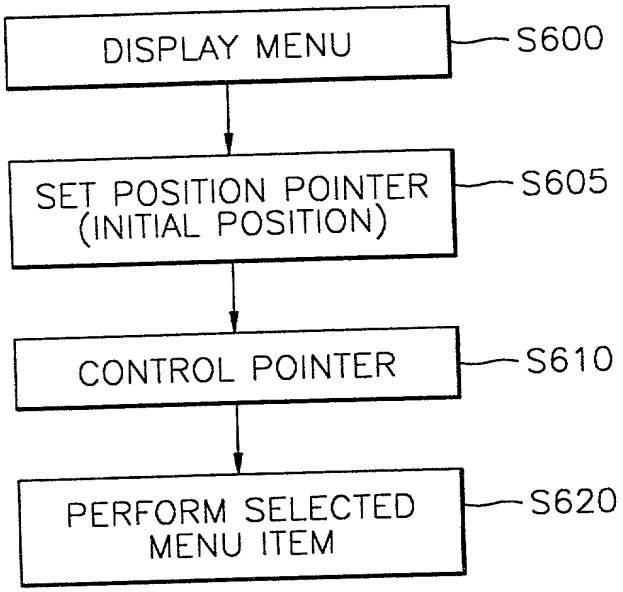

DISPLAY MENU
S600
SET POSITION POINTER (INITIAL POSITION)
S605
CONTROL POINTER
S610
PERFORM SELECTED MENU ITEM
S620

FIG. 7

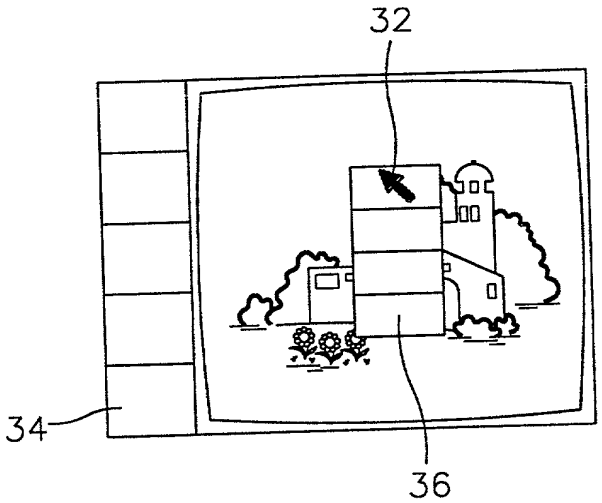

32
34
36

FIG. 8

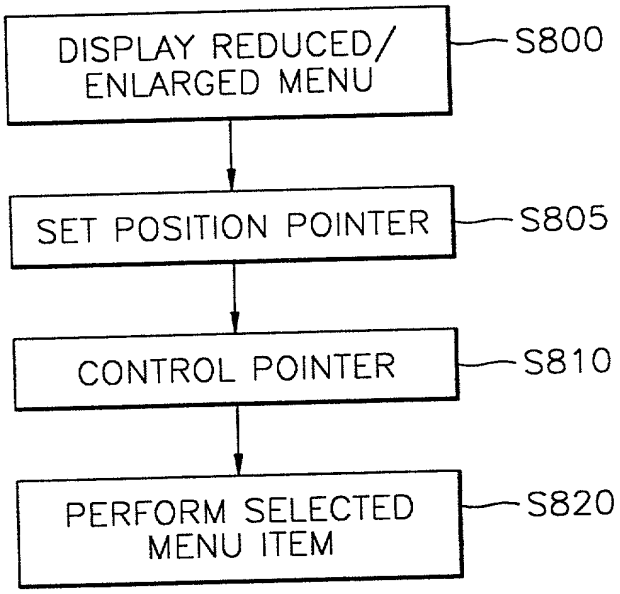

DISPLAY REDUCED/ ENLARGED MENU
S800
SET POSITION POINTER
S805
CONTROL POINTER
S810
PERFORM SELECTED MENU ITEM
S820

FIG. 10

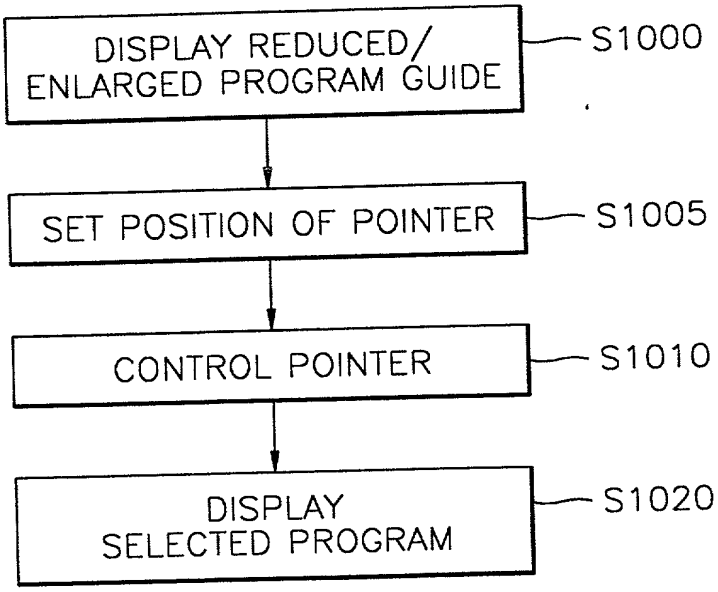

DISPLAY REDUCED/ ENLARGED PROGRAM GUIDE
S1000
SET POSITION OF POINTER
S1005
CONTROL POINTER
S1010
DISPLAY SELECTED PROGRAM
S1020

FIG. 9A

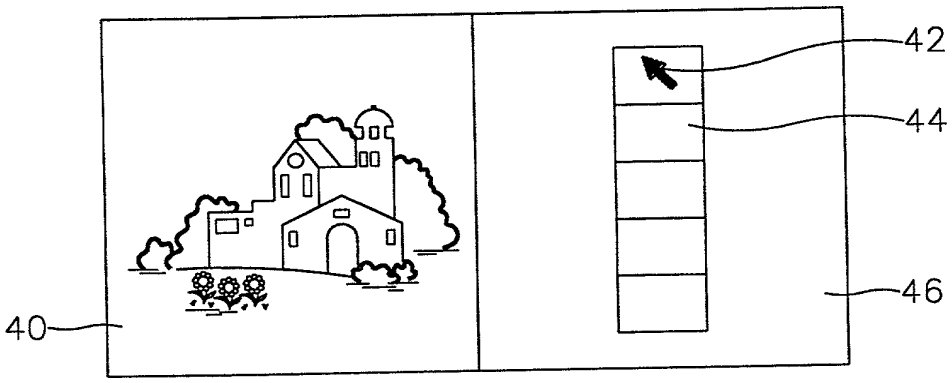


FIG. 9B

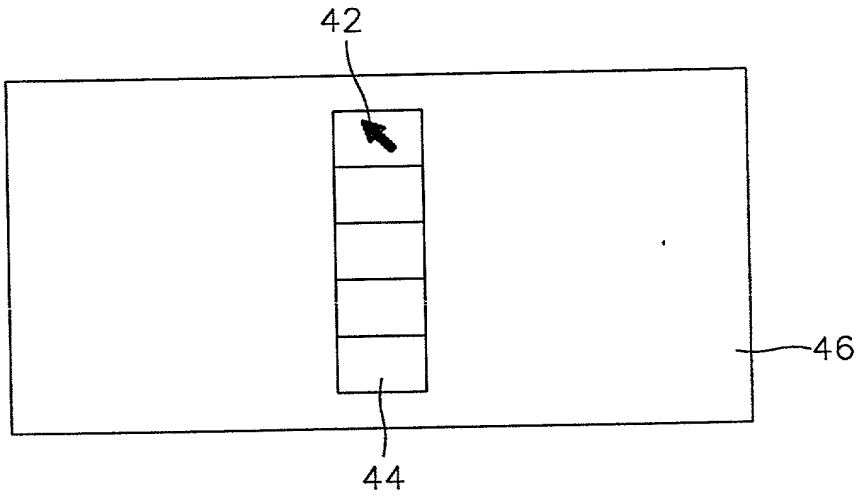


FIG. 11A

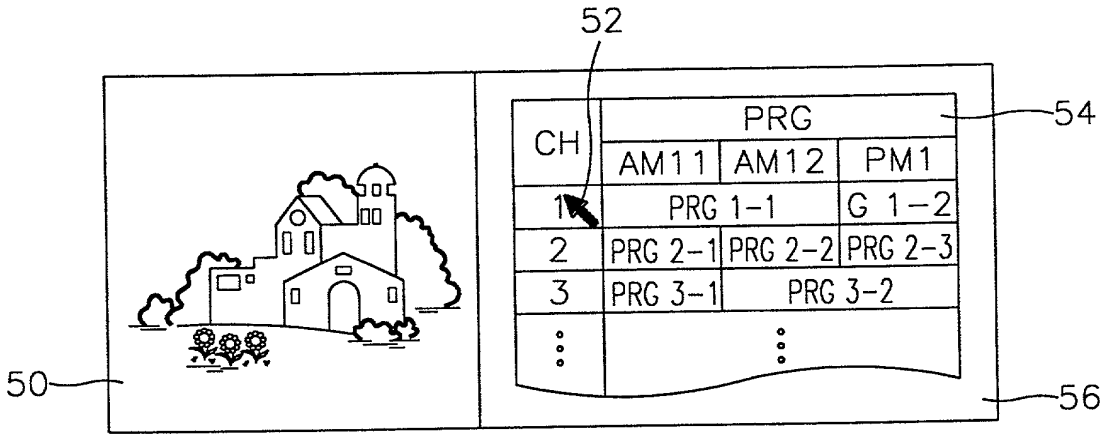


FIG. 11B

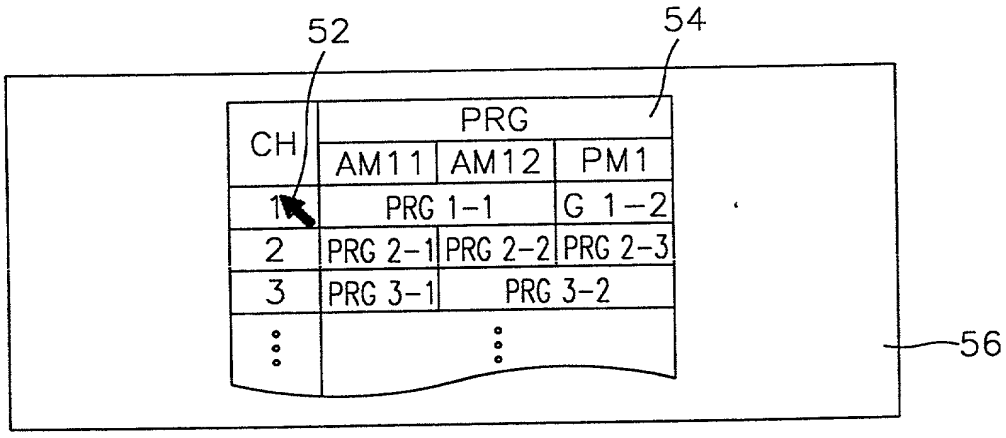


FIG. 12

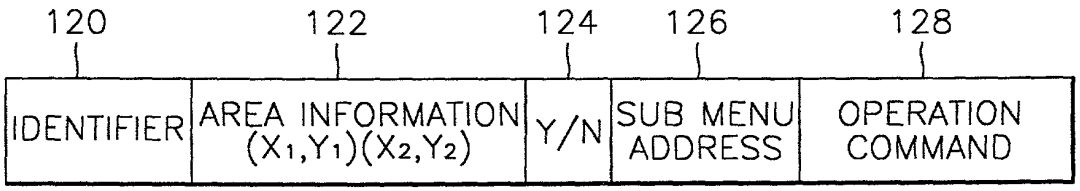


FIG. 13

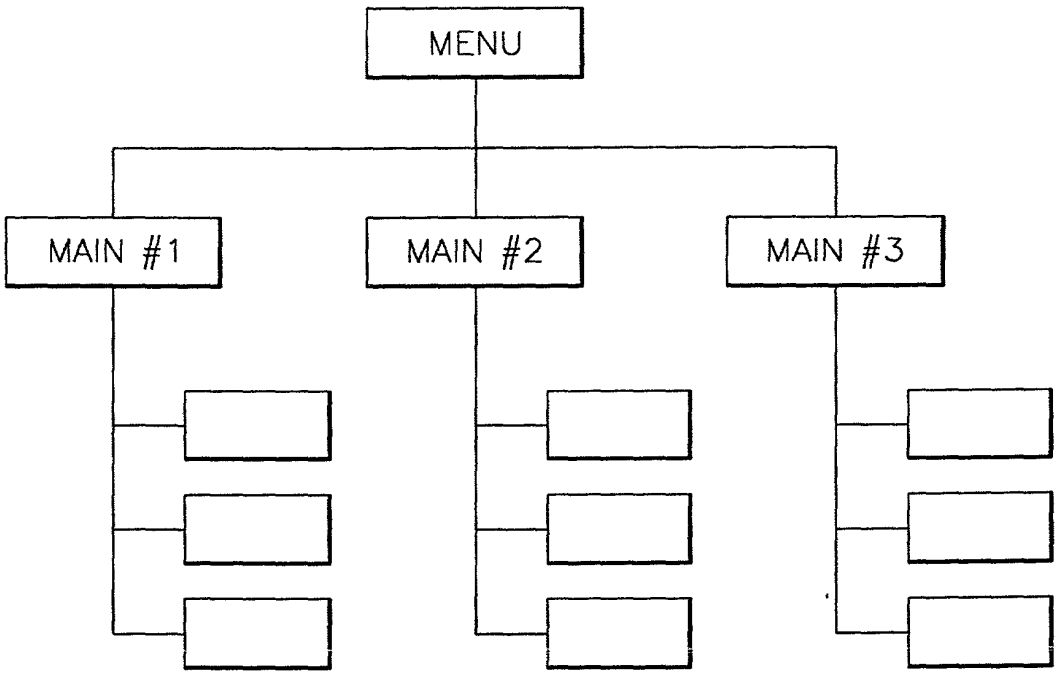
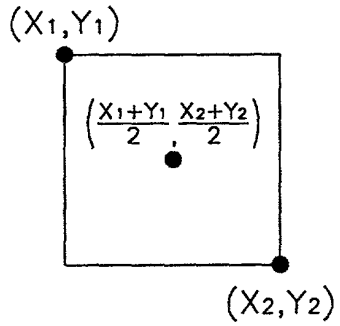
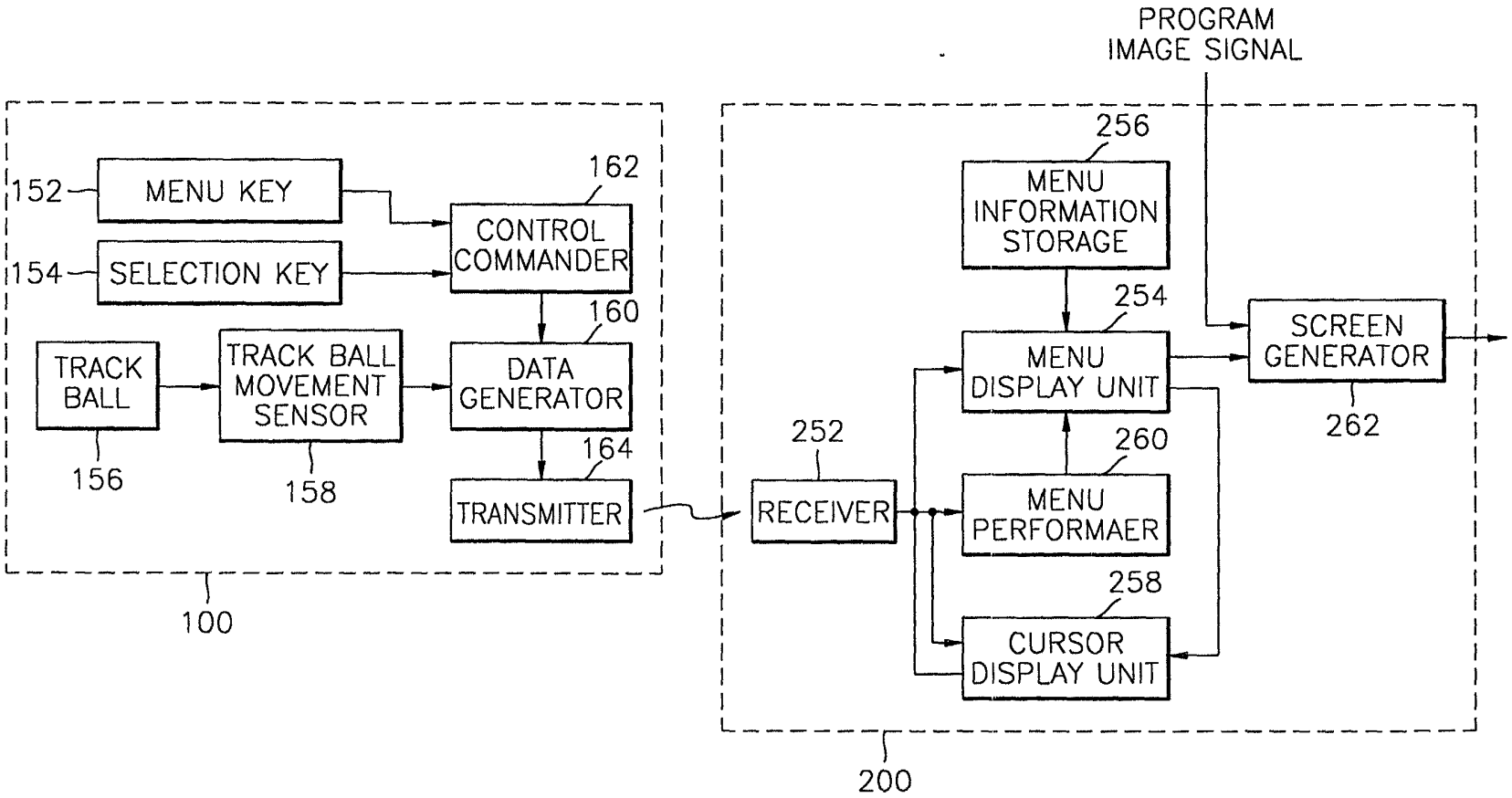


FIG. 14



Getty Images

FIG. 15



ACCEPTED DOCUMENT

FIG. 16

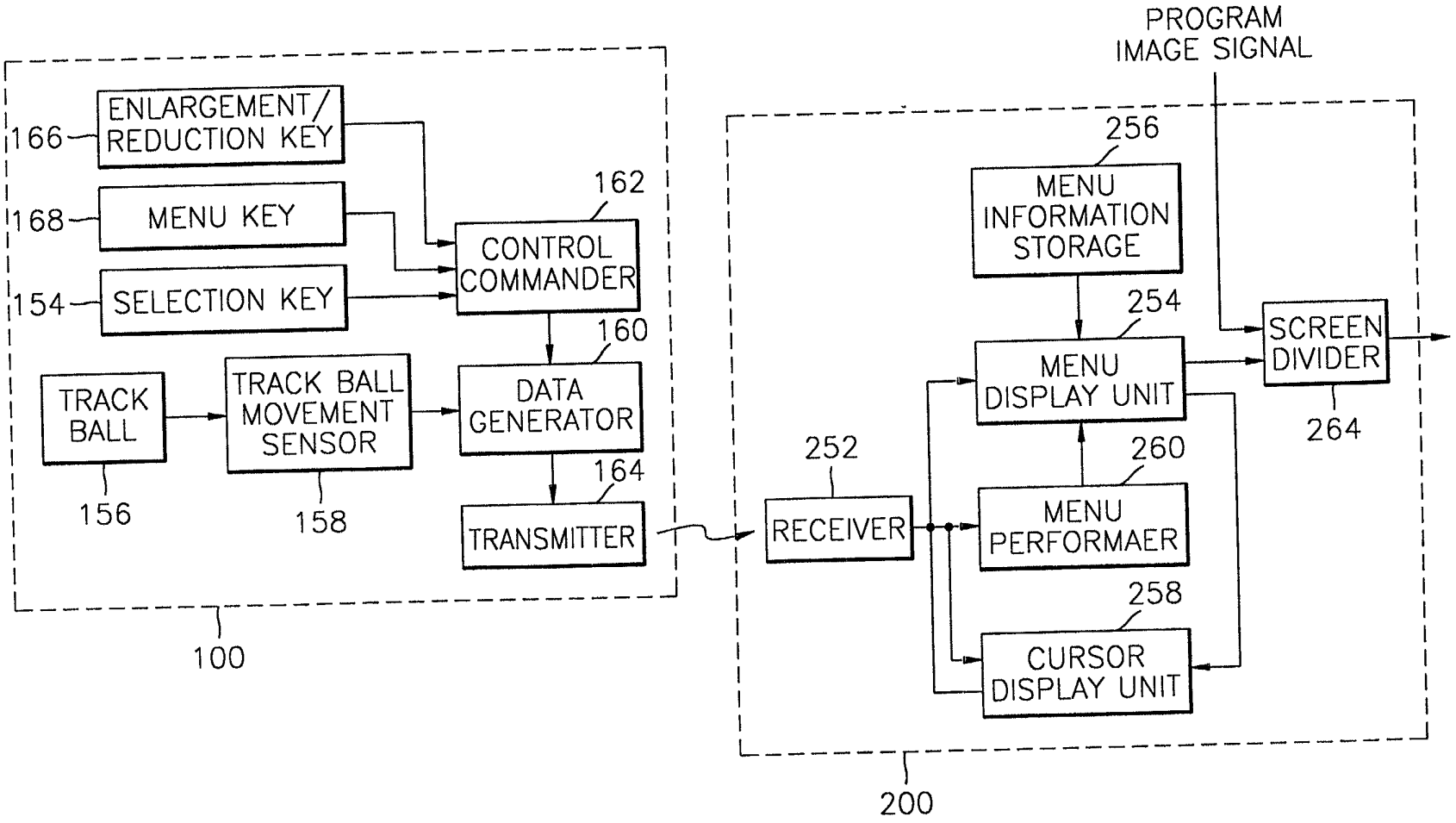
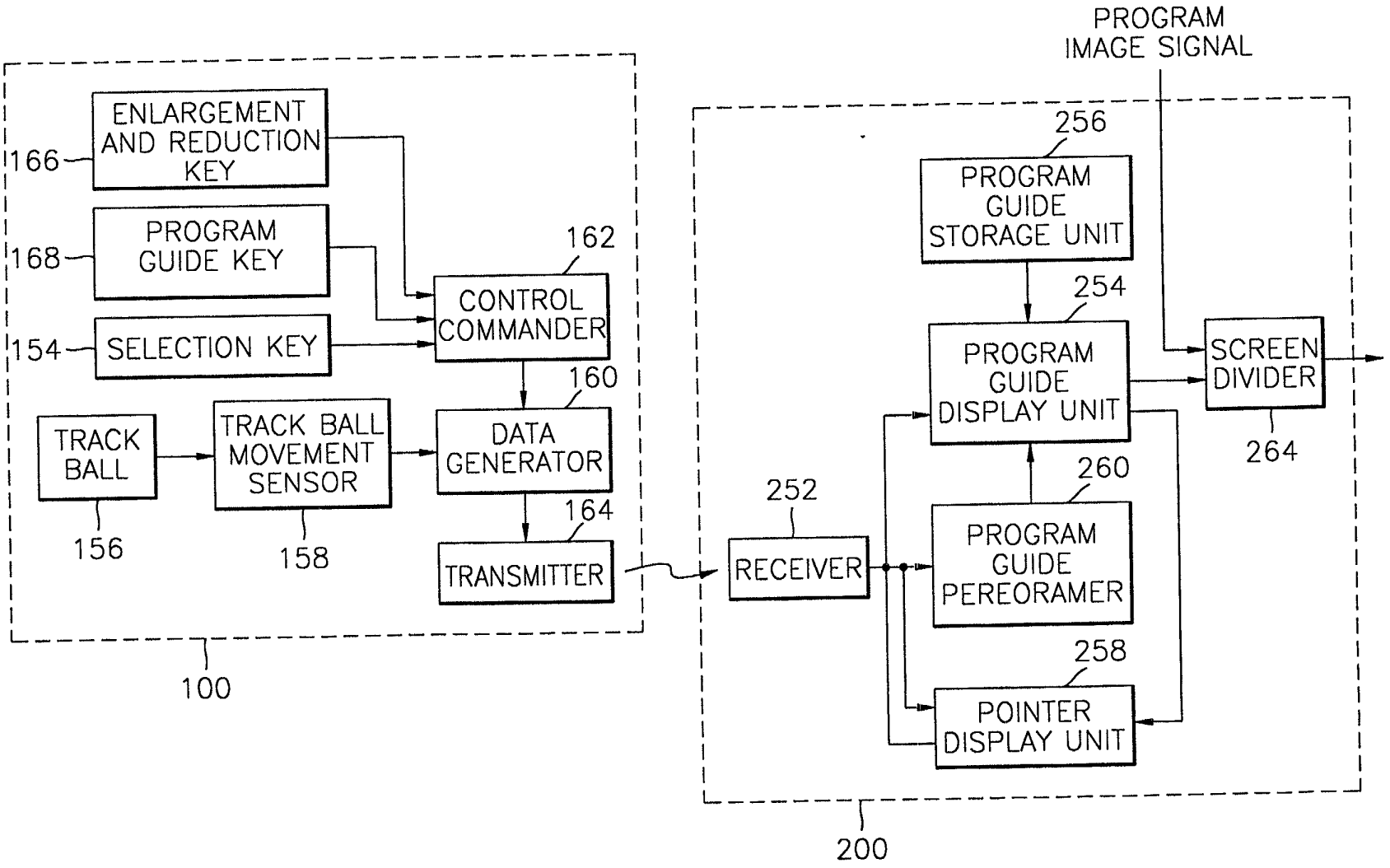


FIG. 17


PROGRAM IMAGE SIGNAL
ENLARGEMENT AND REDUCTION KEY
166
PROGRAM GUIDE KEY
168
SELECTION KEY
154
162
CONTROL COMMANDER
160
DATA GENERATOR
164
TRANSMITTER
TRACK BALL
156
TRACK BALL MOVEMENT SENSOR
158
100
256
PROGRAM GUIDE STORAGE UNIT
254
PROGRAM GUIDE DISPLAY UNIT
SCREEN DIVIDER
264
260
PROGRAM GUIDE PEREORAMER
252
RECEIVER
258
POINTER DISPLAY UNIT
200

PTO/SB/01 (6/95)

DECLARATION

Docket No. P55862

AS A BELOW NAMED INVENTOR, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe that I am the original, first and sole (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below), of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE: *METHOD FOR CONTROLLING POSITION OF INDICATOR*

the specification of which either is attached hereto or otherwise accompanies this Declaration, or:

☐ was filed in the U.S. Patent & Trademark Office on _____ and assigned Serial No. _____

☐ and (if applicable) was amended on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability and to the examination of this application in accordance with Title 37 of the Code of Federal Regulations §1.56. I hereby claim foreign priority benefits under Title 35, U.S. Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, or §119(e) of any United States provisional application(s), listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

			Priority Claimed:
98-43162	KOREA	15 October 1998	Yes [X] No [ ]
(Application Number)	(Country)	(Day/Month/Year filed)	
_____	_____	_____	Yes [ ] No [ ]
(Application Number)	(Country)	(Day/Month/Year filed)	
_____	_____	_____	Yes [ ] No [ ]
(Application Number)	(Country)	(Day/Month/Year filed)	

I hereby claim the benefit under Title 35, U.S. Code, §120, of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, U.S. Code, §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, The Code of Federal Regulations, §1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

_____	_____	_____
(Application Serial No.)	(Filing Date)	(STATUS: patented, pending, abandoned)
_____	_____	_____
(Application Serial No.)	(Filing Date)	(STATUS: patented, pending, abandoned)

I hereby revoke all previously granted powers of attorney and appoint the following attorneys: Robert E. Bushnell, Reg. No. 27,774, Michael D. Parker, Reg. No. 34,973, and Henry M. Zykorie, Reg. No. 27,477, to prosecute this application and to transact all business in the U.S. Patent & Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application, with full power of appointment and with full power to substitute an associate attorney or agent, and to receive all patents which may issue thereon, and request that all correspondence be addressed to:

Robert E. Bushnell,
Attorney-at-Law
Suite 300, 1522 "K" Street, N.W. **Payor No. 008439**
Washington, D.C. 20005-1202 Area Code: 202-638-5740

I HEREBY DECLARE that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF FIRST OR SOLE INVENTOR: PHIL-TAE KIM Citizenship: KOREA

Inventor's signature: _____ Date: _____
Residence & Post Office Address: 202,28-11 Hap-dong, Seodaemun-gu, Seoul, Korea

FULL NAME OF SECOND JOINT INVENTOR: _____ Citizenship: _____

Inventor's signature: _____ Date: _____
Residence & Post Office Address:

FULL NAME OF THIRD JOINT INVENTOR: _____ Citizenship: _____

Inventor's signature: _____ Date: _____
Residence & Post Office Address:

FULL NAME OF FOURTH JOINT INVENTOR: _____ Citizenship: _____

Inventor's signature: _____ Date: _____
Residence & Post Office Address:

☐ Additional inventors are being named on separately numbered sheets attached hereto.